



ALCORN STATE UNIVERSITY
Lorman, MS

FINAL REPORT

Alcorn State University PC25C Fuel Cell Project

Climate Change Fuel Cell Grant DE-FG21-96MC33338

Report on First Year Operations 10/01/00 through 09/31/01

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09/24/02**

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Abstract

Alcorn State University is a National Historic Black University located in Lorman, MS, in the heart of the Mississippi delta region. In fulfilling its mission, Alcorn "seeks to meet the higher education and life enhancement needs primarily of the region and state, without excluding the needs of the nation. To assume the role of a "communiversity" and magnet of learning where scholars are freely encouraged to seek new truths and make the proper application of existing knowledge for the betterment of mankind is highly regarded at the university."

In pursuit of that stated goal, Alcorn procured the necessary funds to purchase and install one United Technologies Company PC25C Fuel Cell power plant through the cooperative efforts of the Mississippi Economic Development Center and the United States Department of Energy. The project has been managed under the direction of the University's School of Industrial Technology.

This purpose of this report is to summarize the major highlights of the fuel cell project since its commissioning in October, 2000, and to advise of its current status.

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Executive Summary

In August 1998, Alcorn State University (Alcorn), grantee, purchased one United Technologies Company (UTC) PC25C Fuel Cell Power Plant, S/N #9134 with the assistance of the DoD Climate Change Fuel Cell Grant program, grantor. UTC delivered the unit to the site in October 1998. The fuel cell had the following configuration (a) to operate on natural gas or anaerobic digester/methane gas; (b) to deliver 800,000 Btu/h waste heat through a customer interface heat exchanger; and (c) to provide both grid connected and/or grid independent electrical service. In May 2000, Alcorn hired LOGANEnergy Corporation, an authorized UTC Fuel Cells representative, to design and complete the installation process. This effort concluded on October 1, 2000 following the initial start and a successful eight hour acceptance test. Figure 11 illustrates the site layout plan. The unit continued to operate intermittently until October 12, 2001, accumulating 5197 total load hours. During the first year of operations, the unit required constant service and support due to various grid interconnection and other systemic problems. The unit has been out of service since October 2001. Currently the unit is in the "energized off state", providing freeze protection for the cell stack assembly. Several controller screens are attached to the end of this report indicating the fuel cell status as of 9/23/02. This report and the Financial Status Report, attached to the end of this document, together with the final invoice mailed under separate cover, constitute the final submittals required by grantor to conclude the project and remit final payment to grantee.

1. Introduction

In April of 1999 United Technologies advised LOGAN that Alcorn State University had received delivery of a PC25C power plant in August of the preceding year, and would need assistance in installing and operating the unit. LOGAN subsequently contacted Dr. Leroy Davis of Alcorn to schedule a meeting to offer assistance. In April of 2000, Dr. Davis invited LOGAN to come to Alcorn to make an installation proposal. Following that, Alcorn hired LOGAN to install, operate and



Figure 1, Alcorn Installation

provide ongoing service for the unit. The particular unit sold to Alcorn, S/N 9134, had a grid connected/grid independent configuration, a low grade thermal recovery interface and the ability to use methane or natural gas. However, due to the limitations imposed by the location chosen by Alcorn to install the power plant, the methane gas option, the thermal recovery option and the grid independent features were not included as a part of the installation. Today the unit operates in a grid parallel configuration only, as it is connected to the campus grid at a remote location, adjacent to the poultry experimental lab, where there is neither a thermal load nor dedicated electrical load to justify the additional costs associated with those functions. The power plant started initially on October 1, 2002 and operated intermittently until October 12, 2001. It has not operated since that time.

2. Results and Discussion:

9/30/00 The fuel cell power plant was started for the first time. It was set to deliver 200kW in a grid connect configuration.

10/24/00 Dr. Beke, Alcorn project engineer, reported that the nitrogen system was not holding pressure. A LOGAN engineer was dispatched and found a leak in the exterior nitrogen and enlisted the original contractor to make the repairs. The first substack readings taken after the power plant had accumulated several weeks (550 load hours) run time indicated an average 5.22 VDC from each of the 32 substacks, totaling of 167.2VDC. See Figure 4.

11/15/00 The power plant shut down on a High TE431 sensor indicated the ancillary loop was not cooling the cell stack. FAN800 (the main heat exchanger that is exterior to the power plant), TS800 (the thermal switch that controls FAN800), and VSD830 (the variable speed drive coolant pump), the glycol level, and the thermocouple were all checked for possible problems. A loose wire was found in TS800, but not definitive of the problem. The power plant was re-started and set to 200kW. FAN800 and VSD830 were overridden to insure that cooling of the cell stack would take place. More time was spent troubleshooting the nitrogen system since the leak was still present. In addition a 480vac isolation transformer had to be installed in the fuel cell to protect various systems from excessive grid voltage often exceeding 510 volts on a nominal 480 volt line.

12/22/00 The power plant lost communications with the UTC fuel cell server. The modem was replaced but still did not respond until the circuit jumpers inside were reconfigured. The nitrogen solenoid valves (CV710 & CV720) inside the power plant were replaced, but a re-test of the system still showed a leak. The nitrogen line coming into the plant was isolated and the problem was narrowed to the customer connection. A day was spent gathering materials to rebuild that section of the nitrogen piping system. After trying a start, it was discovered that the Isotel phone line surge protector was dead, so a new surge protector was installed.

1/24/01 A VT310 out of range event caused a shutdown. VT310 measures the voltage difference between the top half and bottom half of the cell stack. VT310 was removed and the resistors re-soldered. This action was taken because we had noticed that vibration from relays kicking on and off had been causing VT310 readings to wander. An attempted start resulted in a ground fault indication that ultimately



Figure 2, Alcorn Installation

was remedied when the engineer discovered he had accidentally tripped the micro switch on the ground fault box while working on VT310. Once the switch was reset, the power plant started and was set for 200kW. VT310 sensors have performed normally since then.

4/3/01 A tripped breaker on the customer's utility pole caused a shutdown. LOGAN met with a representative from Cutler Hammer, the circuit breaker manufacturer. Pictures were taken of the damaged breaker as water incursion was suspected.

4/9/01 A meeting was set up at the site to further inspect the breaker problem of the past week. A test, where water from a garden hose sprayed on top of the customer's utility pole weather head, revealed that water was getting down the inside of the electrical conduit through the weather head and causing water damage to the breaker. Upon further inspection, the weather head had not been installed properly. A new breaker was ordered. Also, a retrofit was installed on BLO100 (the air intake for the cell stack) to insure a better seal around the silencer box and blower housing.

4/26/01 Resin and carbon was picked up in Atlanta on the way to Alcorn for water treatment system maintenance. An electrical contractor representative arrived on site to install the new Cutler Hammer 400 Amp breaker. After installation, the same water test was given and water continued to show up inside the breaker box. The weather head was inspected again, and it was determined that a manufacturing defect caused it to leak. Another was ordered.

4/27/01 The power plant was restarted, but immediately showed a High TE431 event, so FAN800 was overridden on and VSD830 was overridden to 100%. The power plant was set at 200kW. Substack testing revealed that the average substack voltage had dropped 0.1 volt since the first test.

5/22/01 Overrides were removed from FAN800 and VSD830 and temperatures were monitored to understand more about the High TE431 problem. FAN800 was overridden "on" at the end of the test. Met with Dr. Beke to discuss the weather head and breaker issues to resolve who would pay for them.

5/31/01 The weather head had arrived, so the power plant output was reduced to idle and disconnected from the grid while utility workers installed it. When the work was done and the plant put back on line, it shut down because the power conductors were re-installed out of phase. This was corrected and the plant was started and set at 200kW.

6/4/01 The plant was re-started after a TE400 and TE431 shut down event. FAN800 override was returned to "on", but the TE400 event returned 5 hours later. Both lockout relays tripped and Fan 800 override was "off". A UPS functional check was run; the cathode air valve (FCV110) was adjusted, and fuel pressure as well. The plant was started and set at 200kW.

7/8/01 The resin and carbon bottles in the water treatment system were recharged with fresh materials.

10/12/01 An inverter issue caused a shut down that pointed to a failure in bridge 2. The LEMS were changed out, but when the plant was re-started, the motorized circuit breaker

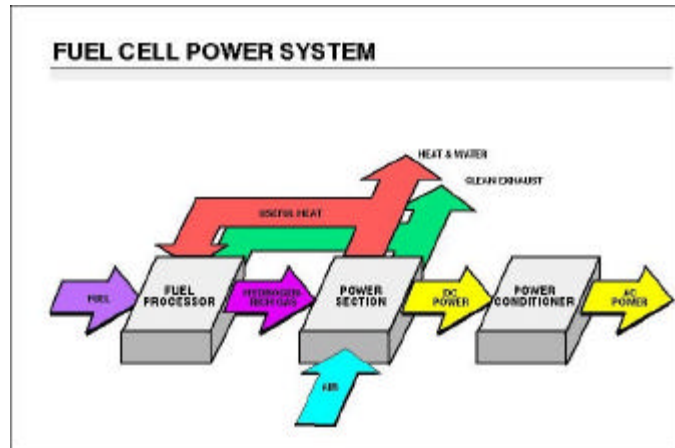


Figure 3, PC25 Fuel Cell System Diagram

(MCB1) would not engage. In addition, a rupture in the water main servicing the fuel cell area of the campus prevented further operations until the main could be repaired.

11/27/01 The water treatment system conductivity eye (CE450) gave an alarm that required the carbon and resin bottles to be changed. A leak was also repaired in LCV452, which controls the make-up water flow into the plant. Another BLO100 retrofit kit was installed that greatly increased the effectiveness of the air filtration into the power plant.

12/18/01 The power plant had been in "water conditioning" waiting for further service when the lockout relays tripped and sent it out of its default position. A service call was needed to reset the plant and get it back into waterconditioning. The limit switches on MCB001 were reset and tested. The technician found that the ILS heaters would not get the temperature anywhere near the needed minimum for a startup. Troubleshooting found that all 3 ILS heaters were either partially or completely failed.

1/14/02 Installed 3 new ILS heaters, and departed the site until the following week to allow the ILS to warm back up to its 500 degree F. set point.

1/20/02 Attempted several power plant starts but burner would not light. Cleaned the spark plug, which had rusted during the last few months since the plant had not run. Start up required 3 long catalyst reductions. The last 2 times, as the plant transitioned to idle, the controller would drop out and shut the plant down. Troubleshooting revealed that the UPS battery needed replacing, so one was ordered and installed. Two more attempted starts ended in inverter shutdown events. More LEMS were ordered.

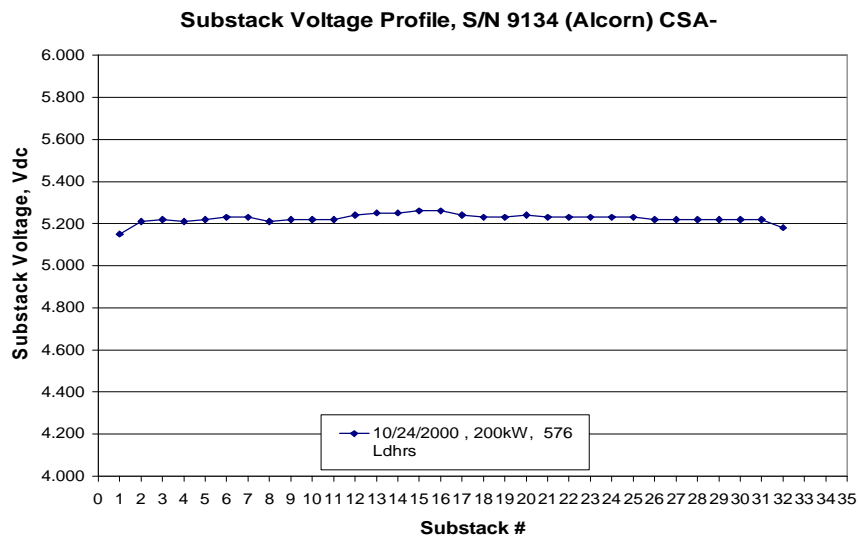


Figure 4, Alcorn Univ. S/N #9134 Initial Substack Profile

3/6/02 Testing of the inverter slave cards was required to determine which of the 6 inverter bridges were causing the shutdown problem. After swapping out good inverter slave cards in the various slots, the problem was narrowed to slave cards 1 & 2, so 2 new slave cards were requested, however UTC would not ship the cards since Alcorn still had a large unpaid bill due them. Water main was determined to be serviceable again.

6/15/02 LOGAN advised Drs. Beke and Moses that there was no communication with the fuel cell. No action was requested by Alcorn.

9/13/02 On this date, LOGAN provided its first service call in six months following the issuance of a new contract purchase order. A fuel cell engineer attended the site to trouble shoot outstanding issues and make preparations to return the fuel cell to service. The engineer discovered that the fuel cell was

without power because the 400 amp service breaker was in the off position. It could not be determined whether it had tripped or had been purposefully opened. The breaker was reset and the fuel cell powered up again and left in water conditioning awaiting further service. At this time, the condition of the cell stack remains undetermined until the power plant can be restarted.

3. Additional Discussion:

Issues to be Resolved Before Restoring Grid Parallel Service

As a year has passed since the power plant has operated under load, a number of items must be reviewed and/or corrected before attempting to operate the unit. They are as follows:

- i. Determine whether the water treatment resin is still serviceable in both the WTS beds and in the Demn 440 vessel.
- ii. Determine which inverter logic cards need to be replaced.
- iii. Determine why the grid connect breaker in the fuel cell does not close after initiating the grid connect command.
- iv. Determine why the service breaker tripped in June of 2002.
- v. Perform catalyst reductions in both the reformer and ILS vessels.
- vi. Evaluate the condition of the cell stack once the power plant is back in idle mode.

4. Mean Time Between Forced Outages (MTBFO)

During the period October 1, 2000 through September 31, 2001, the fuel cell accumulated approximately 5200 hours. During that period the unit experienced 10 forced outages due to various grid interconnection and other systemic problems. In view of this record, the mean time between forced outages (MTBFO) for the period was 520 load hours.

5. Reliability

Judging by the reliability standards of a large number of PC25 units that LOGAN supports throughout the US, this unit S/N 9134, falls short of expectations. During the actual commissioning and startup of the unit a number of components failed right away and had to be replaced at substantial cost including Pump450, Ejector valve 010, and Vt310 resistor board. It should be noted that the unit sat on its pad idle, unprotected from the elements, and unattended for nearly two years prior to the installation and initial start. Initial inspection by LOGAN revealed interior water damage, infestation of insects and possible

rodent damage to wiring and conductors. In addition many printed wiring labels were illegible due to repeated condensation/drying cycles. The unit itself had a hybridized, natural gas/methane gas fuel train that had been standardized at the factory for methane gas. Since methane gas was not available to the site, the unit had to be reconfigured in the field to run solely on natural gas. This required rewiring and terminating many electrical conductors, often through trial and error, since the wiring labels were illegible. UTC was very helpful throughout the endeavor, but in general it appeared that S/N 9134 did not receive an appropriate level of quality assurance prior to being shipped to the site.

Reliability has also suffered because the university's project engineer, Dr. Herbert Beke, has been unable to respond to routine service issues for the past year due to personal health problems. A payment dispute between the university and the manufacturer caused a lapse in the availability of parts for a period of one year, but that issue has been cleared at this reporting. As a result of a poor record of reliability, the power plant availability during the report period has been 58%.

6. Thermal Output

For the reasons stated in the introduction paragraph, this installation has no thermal recovery.

7. Environmental Benefits

The environmental benefits of fuel cell power generation have been certified by several independent state and federal agencies; most notably the South Coast Air Quality Management District in California.

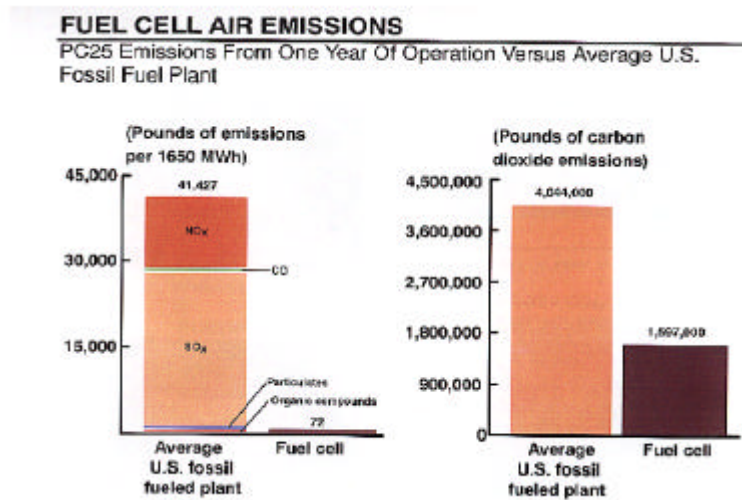


Figure 5

In that regard, the PC25 has an enviable record. One unit operating at 200kW for one year occludes in excess of 40,000 pounds of harmful emissions as compared to an equivalent number of megawatt hours normally associated with oil or coal fired power generation.

8. Cost Benefit Analysis

Alcorn State University Fuel Cell Program

Simple Project Cost Benefit Analysis
October 1, 2000 through September 31, 2001

Installation Cost	\$163,000	
Total Load Hours	5200	
Total kWh produced during report period		1,040,000
Estimated MCF NG	9,023	
Ave. Cost per MCF	\$4.95	
Cost NG	\$44,664	
Cost of Service/Materials	\$32,000	
Total operating cost		\$76,664
Cost per Fuel Cell kWh	\$0.074	
Cost displaced electricity	\$0.065	
Benefit	-\$0.009	
Ratio		-8.46

Figure 6, Cost/Benefit Analysis

9. Current Status of S/N 9134 as Viewed on Controller Screens of 9/23/02

A. Power Plant Operations Screen

```
T Screen #: 001 Page #: 00 ScrFileID#: 4A26 ESC or Q =
Quit
                                POWER PLANT OPERATIONS
P/P 9134    09/23/02    1132:31    EVENTS: 0    OVERRIDES: 0
P 30    R 5    S 30    W 10    A 30    N 5    C 5    L 10    I 200

Shutdown                                FUEL STATUS
Burner Relight                          FUEL: Natural Gas
Power Reset

MODE SELECT                                POWER PLANT STATUS
Idle                                    Shutdown
Load, Grid Connected
Load, Grid Independent
Load, Loadsharing

SET POWER                                10 KWAC    ACTUAL POWER                                0 KWAC
OPERATING TIME 5197 HR                STACK LOOP TEMP    130.9 DEGF
CUMULATIVE POWER    955 MWHR          REFORMER TEMP    91 DEGF

LATCHED SHUTDOWNS (Enter 0 to clear)
TOTAL EVENTS (Enter 0 to clear)    0

PPC Software Revision:    4.20          PCS Software Revision:    6.00

1Helpb 2Send    3ClrOvr 4ClrAll 5LstScr 6Oper    7Event 8Scr_10 9 Scr_11
10Elec
```

Figure 7 *** Note cumulative operating time in yellow bar

B. Power Plant Recent Events History

T Screen #: 007 Page #: 00 ScrFileID#: 2822

ESC or Q = Quit

POWER PLANT EVENTS HISTORY				
TIME	DATE	LD TIME	EVENTS	P/P 9134
0029:41	09/22/02	5197	I Utility grid voltage unbalanced	
0028:09	09/22/02	5197	I Utility grid voltage unbalanced	
0027:44	09/22/02	5197	I Utility grid voltage unbalanced	
0027:38	09/22/02	5197	I Utility grid voltage unbalanced	
0819:15	09/19/02	5197	I Fuel cell DCV < 150 VDC for 5.0 s	
0819:12	09/19/02	5197	I Protection reset not clear	
0819:12	09/19/02	5197	I Entered I200 - Shutdown	
0819:11	09/19/02	5197	I Fuel cell DCV < 140 VDC for 0.2 s	
0819:09	09/19/02	5197	PCS/ARCNET failure (write)	
0819:08	09/19/02	5197	COM3 16550 UART Detected	
0819:08	09/19/02	5197	COM2 16450 UART Detected	
0819:08	09/19/02	5197	COM1 16450 UART Detected	
0819:08	09/19/02	5197	I Entered I5 - Initialization	

<PgUp> OR <PgDn> TO CHANGE PAGES

1Helpb 2Send 3ClrOvr 4ClrAll 5LstScr 6Oper 7Event 8Scr_10 9Scr_11 10Elec

Figure 8 *** Note controller reading grid voltage unbalanced which is an ongoing issue with the utility at this fuel cell location. The condition and effects operating availability as the fuel cell often cannot synch phase with an unbalanced grid.

C. Reactant, Ancillary Coolant, Nitrogen and Cabinet Vent Systems

```

T Screen #: 010 Page #: 00 ScrFileID#: 9CDA                               ESC or Q =
Quit
                                RSS/APS/NPS/CVS
09/23/02 IDC=      0 VDC= 4.1   KWACNET= 0.0 IDCNORM= 0.0 EVENTS:   0
1131:37  TE400FT= 131   TE012FT=  91   VT310DEL= 1.76   OVERRIDES:
0
P/P 9134  P  30  R   5  S  30  W  10  A  30  N   5  C   5  L  10  I 200

TE012      REF TUBE TEMP (PRIMARY)91 DEGF   SETPOINT:   1495
TE012R     REF TUBE TEMP (BACKUP)91DEGF     TEMPFACT:   1.35
TE012DEL   REF TUBE TEMP DELTA 0 DEGF       CONT MAX/MIN LIM 1.35
FT012ACT   ACTUAL FUEL FLOW 0.0 PPH         SETPOINT:   0.0 PPH
ZT010      EJECTOR POSITION 0.4%            SETPOINT:   0.0%
PHIMON     PHI MONITOR 44.85               FUELTOT (SCF) 9023592
TE350      ANODE INLET TEMP 107 DEGF       PT350/FB (OPT) 0.0
TE002      HDS BED TEMP 395 DEGF           HTR002 STATUS: OFF
TE001      PRE-OX BED TEMP(OPT)0 DEGF      FCV012 (FUEL ALVE)0.0
TE010      HDS INLET TEMP(OPT)0 DEGF       FT012ERR   0.0
FT140      BURNER AIR FLOW 2.8PPH          SETPOINT: 0.0 PPH
ZT110      CATHODE AIR VALVE POS-0.5%      SETPOINT: 0.0
PT012      FUEL VALVE EXIT PRESS14.63PSIA  TE011 (FUEL, DEGF)97
TE150B     MOTOR COMP EXIT TEMP 94 DEGF    TE150A (AMB.,F)93
FAN150     MOTOR COMPARTMENT FAN OFF       MOTOR COMP FS150 OFF
FAN165     FUEL COMP FAN OFF               FUEL COMP FS165 OFF
CV720      FUEL SIDE N2 VALVE CLOSED        ANODCONF (LBS) 0.0
CV710      AIR SIDE N2 VALVE CLOSED        AT201 (ADG ONLY) 0.0

1Helpb 2Send  3ClrOvr 4ClrAll 5LstScr 6Oper  7Event 8Scr_10 9Scr_11
10Elec

```

Figure 9 * Note total natural gas consumption in SCF under yellow bar.**

D. Cell Stack Loop/Ancillary Loop Temps, Water Treatment System

```

T Screen #: 011 Page #: 00 ScrFileID#: 943D                                ESC or Q =
Quit
                                STACK LOOP, ANC LOOP, & WTS
09/23/02 IDC=      0 VDC= 4.2      KWACNET= 0.0 IDCNORM= 0.0 EVENTS:   0
1131:24  TE400FT= 131   TE012FT=   91   VT310DEL= 1.76   OVERRIDES:
0
P/P 9134  P  30  R   5  S  30  W  10  A  30  N   5  C   5  L  10  I 200

TE400    SEPARATOR TEMP (PRIMARY)131  SETPOINT: 130
TE400R    SEPARATOR TEMP (BACKUP)131  SEP TEMP FACTOR 1 deg F
TE400DEL  SEP TEMP DELTA 0 DEGF        STK FLOW SW (FS400) ON
TE401     COOLANT INLET TEMP131 DEGF    SETPOINT: 120
TE431     POLISHER TEMP 89 DEGF        F/W TEMP SW (TS451) ON
TE820     CONDENSOR EXIT TEMP 89DEGF    TE820 CONT. ERR (DEGF) 94
VSD830    PMP830 SPEED      27 %       VDCNORM (VOLTS) 5.5
CE450     CONDUCTIVITY      NORMAL     STEAM MODE: DISABLED (OPT.)
LT400     SEPERATOR LEVEL 9 IN         PT350   0.0 IWC AIPFB  0 KW
LT450     WATER TANK LEVEL 41.4N       WTSFB   0.0
TE464     ILS COOLANT TEMP 0 DEGF      SETPOINT:   0
PMP451    WTS FEED WATER PUMP OFF     PUMP ON TIME (MIN)  0
STARTTEMP TEMP FOR REF HEATUP 180DEGF  NCELLFACT  1.000
IDCNET    NET DC CURRENT  AMPS        LT450FT (IN) 41.4
HTR400    ELEMENT 'A' OFF             ELEMENT 'C'   OFF
          ELEMENT 'B' OFF             ELEMENT 'D'   OFF

1Helpb 2Send  3ClrOvr 4ClrAll 5LstScr 6Oper  7Event 8Scr_10 9Scr_11
10Elec

```

Figure 10 *** Note TE400 sensor indicates that Separator temperature on set point to maintain cell stack freeze protection.

10. Certification

LOGANEnergy Corporation certifies that to the best of its knowledge Alcorn State University has completed all of its obligations under Climate Change Fuel Cell Grant DEFG21-96MC33338, and attests to the sufficiency of those activities in meeting all grant obligations

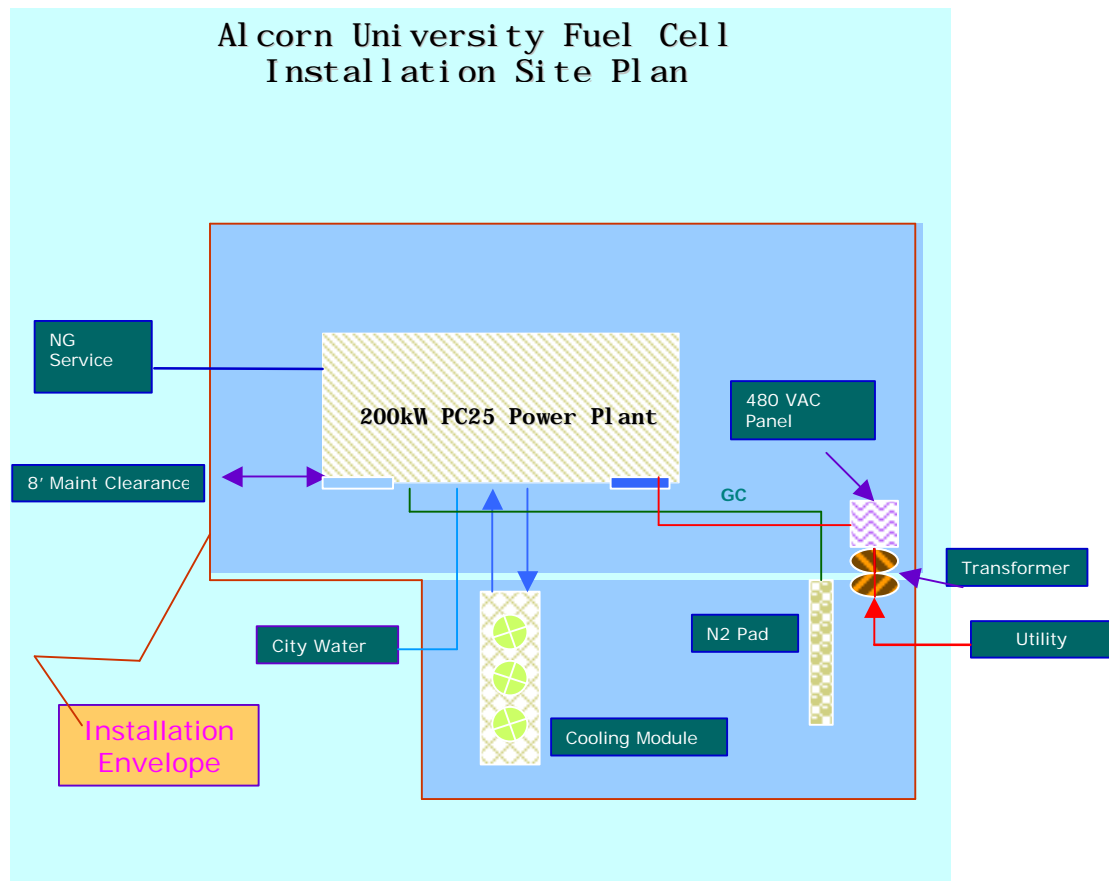


Figure 11, Installation Site Plan

10. Conclusions

The Alcorn State University fuel cell program provides the university with the opportunity to demonstrate an emerging energy technology in a rural area that experiences frequent grid outages. Unfortunately the university administration would not allow the fuel cell to be sited at a campus location where it could demonstrate the additional benefits of thermal recovery and critical load management. Despite its remote location, where it is far removed from the center of campus activity, it nevertheless serves a useful purpose in providing line stability to some loads at the very end of the campus grid. Should Alcorn ever decide to move the unit, or should it ever plan new construction near the fuel cell site, every effort should be made to capture all of the energy benefits that the fuel cell is capable of providing.

11. Final Financial Status Report

The Project financial status report is attached below.

FINANCIAL STATUS REPORT		Federal Agency and Organizational Element to which Report is Submitted DOE Morgantown Energy Technology Center			Federal Grant or Other Identifying Number DE-FG21-96MC33338		OMB Approved No. 80-R0180		Page 1 of 1	
Recipient Organization Alcorn State University 1000 ASU Drive, 590 Lorman, MS 39096		Employee Identification Number 64-6000013		Recipient Account Number or Identifying Number		Final Report YES*** NO		Basis Cash*** Accrual		
		Project Grant Period		Period Covered by This Report						
		From 05/30/96 To 09/31/02		From 10/01/00 To 09/23/02						
Status of Funds										
	Program Activities	Closing Documentation	Project Mgmt General & Administrative	Site Preparation	Construction	Equipment	Engineering	Initial Start-up Acceptance Testing	Total	
a	Net outlays previously reported	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
b	Total outlays this report period	\$0	\$35,000	\$7,725	\$53,198	\$650,000	\$49,700	\$20,000	\$815,623	
c	Less: Program income credits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
d	Net outlays this report period	\$0	\$35,000	\$7,725	\$53,198	\$650,000	\$49,700	\$20,000	\$815,623	
e	Net outlays to date	\$0	\$35,000	\$7,725	\$53,198	\$650,000	\$49,700	\$20,000	\$815,623	
f	Less: Non-Fed share of outlays	\$0	\$27,650	\$6,026	\$39,899	\$487,500	\$39,263	\$15,286	\$615,623	
g	Total Fed share of outlays	\$0	\$7,350	\$1,700	\$13,300	\$162,500	\$10,437	\$4,714	\$200,000	
h	Total unliquidated obligations	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
i	Less: Non-Fed share of unliquidated obligations	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
j	Federal share of unliquidated obligations	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
k	Total Fed share of outlays and unliquidated obligations	\$0	\$7,350	\$1,700	\$13,300	\$162,500	\$10,437	\$4,714	\$200,000	
L	Total cumulative share of Fed funds authorized	\$0	\$7,350	\$1,700	\$13,300	\$162,500	\$10,437	\$4,714	\$200,000	
m	Unobligated balance of Fed funds	\$0	\$0	\$0	\$0	\$0	\$0		\$0	
Indirect Expense		Type of Rate			Certification I certify that to the best of my knowledge and belief that this report is correct and complete and that all outlays and unliquidated obligations are for the purposes set forth in the award document.		Signature of Authorized Certifying Official Samuel Logan, Jr		Date Report Submitted	
		Provisionial	Predetermined	Final					Fixed	9/24/2002
		Rate	Base	Total Amount	Federal Share	Typed or Printed Name and Title Samuel Logan, Jr. President		Telephone 770-650-6388		
Remarks: Attach any explanation deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation										

Project: Alcorn State University